REMARKS

On June 25, 1991, Examiner McCarthy placed a telephone call to applicant's counsel, Martin L. Faigus, for the purpose of advancing the prosecution of this application. During the conference Mr. McCarthy advised counsel of the existence of U.S. Patent Nos. 4,479,880, issued to Treanor, and 4,604,197, issued to Louboutin et al. In that conference the Examiner stated his opinion that independent claim 1, as filed, was not patentably novel over the Treanor patent. The Examiner did suggest that combining the subject matter of originally filed claims 4 and 7 with independent claim 1 might very well define a patentably novel method.

Applicants have amended claim 1 in accordance with the suggestions of the Examiner. In addition, applicants have cancelled claims 4, 7-11, 14 and 15, in view of the amendments made to independent claim 1. Moreover, claims 2, 3, 6, 12 and 13 have been amended, to take into account the amendments presented to claim 1.

Applicants' counsel has carefully studied the Treanor and Louboutin et al. patents, and agrees that the method specified in claim 1, particularly as amended herein, sets forth patentably novel subject matter.

At the outset, it should be noted that the Treanor patent discloses an air scour backwash operation in a gravity or pressure filter system, wherein filtration takes place by the downward flow of influent through the filter bed 7. In

distinction to this operation applicants' invention resides in a method of washing "an upflow filter . . . through which influent to be filtered is directed in an upward direction during each service run" (emphasis added). Thus, the distribution of particulate contaminants from the influent in the filter bed of applicants' invention will be different from the distribution in the filter bed of the Treanor device, by virtue of the fact that filtration in applicants' invention takes place as the liquid passes upwardly through the bed, as opposed to downwardly through the bed as in the Treanor system. Specifically, in downflow filter systems of the type disclosed in Treanor (wherein fine media particles susceptible of being entrained in the air bubbles will inherently be disposed in the upper surface region of the filter bed) there will be a high concentration of floc collected and retained at or adjacent the upper surface of the filter bed. However, in an upflow filter system of the type described and claimed in this application floc tends to collect deep within the bed, with only a minimum concentration of floc being collected adjacent the upper surface of the bed. As a result of this and other differences between downflow and upflow filter systems, applicants submit that a person skilled in the art would not consider it obvious to employ a backwashing arrangement of the type disclosed in the Treanor patent in an upflow filter method of the type specified in the claims of the instant application.

However, assuming arguendo that one would look to the teachings of Treanor in connection with the designing of an

upflow filter system, applicants submit that the claims, particularly as amended herein, set forth patentably novel subject matter. The Treanor patent discloses a three-stage backwashing operation for cleaning a non-buoyant bed, but does not teach or suggest terminating or discontinuing the backwashing operation when cleaning such a bed with floc being retained in the filter layer from a previous service run.

In method claim 1, even prior to amendment herein, it was specified that the combination of air and liquid was directed upwardly through the non-buoyant bed for disrupting only some of the floc retained in the layer during a previous service run, while at the same time leaving some floc attached to the particulate matter in the filter layer. As amended herein, claim 1 makes it clear that some floc is not merely inadvertently left behind. Rather, claim 1 now specifies that the act of directing a combination of air and liquid in an upflow direction through the non-buoyant filter bed is discontinued after a period of time in which the headloss through the filter layer is "at least fifteen percent greater than the headloss through said layer when the layer is free of floc." The benefits of this arrangement are discussed in detail on pages 23-26 of the specification.

A method of operating an upflow filter employing non-buoyant media, whereby the bed is only partially cleaned, as is now specified in claim 1, is neither shown nor suggested in the Treanor patent or in any of the other patents made of record.

Although original claim 1 specified that the liquid directed upwardly through the filter bed, both in combination with air, and subsequently by itself, is at a velocity below the minimum fluidization velocity, amended claim 1 now clearly specifies the preferred range of approximately 5-20 gallons per minute per square foot. Also, to emphasize the significance of the combined air and liquid flow rates, claim 1 also has been amended to specify that the air flow is in the range of approximately 1-9 standard cubic foot per minute per square foot. These features of water and air flow rates are neither shown nor suggested in the prior art of record and therefore these limitations further patentably define the method of this invention over the prior art.

The Louboutin et al. patent relates to a submerged filter system wherein air and influent to be treated are simultaneously directed in an upflow direction through the filter bed 3. Subsequently, after the granular mass of the filter bed becomes clogged, it is washed in a first phase with a combination of air and clean water directed in an upstream direction through the filter media. Subsequently, in a second phase, clean water alone is directed through the media. The Louboutin et al. patent is considered to be less relevant than Treanor, in that it fails to disclose any desirable flow rates for the water and/or air during any phase of the backwashing operation. Moreover, the Louboutin et al. patent fails to teach any desirable benefits of terminating the backwashing operation at a point in time when the

headloss through the filter bed is at least fifteen percent greater than the headloss through the bed when the bed is free from floc, as is now specified in amended claim 1.

In view of the above remarks applicants submit that independent claim 1 now sets forth patentably novel subject matter, and therefore an indication to that effect is respectfully requested.

Claims 2, 3, 5, 6, 12, 13 and 16-26 are either directly or indirectly dependent upon independent claim 1, and therefore are submitted to be patentable for at least the reasons discussed above in connection with claim 1.

Claim 2 is dependent upon claim 1 and specifies that the liquid directed in an upflow direction in steps (a) and (c) is the influent liquid directed through the filter layer during services runs. This is in distinction to the teachings in Treanor and Louboutin et al., wherein clean water is used during the backwashing operation.

Claim 6 is dependent upon claim 1 and specifies that the velocity of liquid in steps (a) and (c) is less than one-half the minimum fluidization velocity of the filter layer. This feature in combination with the features of parent claim 1 is neither shown nor suggested in the prior art of record, and therefore claim 6 is submitted to be patentable thereover.

Claims 16-26 are either directly or indirectly dependent upon claim 1 and specify preferred details of construction of the filter bed. The features specified in these

claims, in combination with the features specified in the parent claims from which they depend are neither shown nor suggested in the prior art of record and therefore claims 16-26 are submitted to be patentable thereover.

In view of the above remarks applicants submit that all of the claims presented for consideration herein are patentable, and therefore applicants respectfully request an indication to that effect.

Respectfully submitted,

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CERTIFICATE OF MAILING

I hereby certify that the foregoing PRELIMINARY AMENDMENT re application Serial No. 07/576,023 is being sent to the Honorable Commissioner of Patents and Trademarks Office by telecopier to Fax No. 703-308-3719, this 27th day of June, 1991.

Martin L. Faigus